

Bearing arrangement

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Applicant: SKF GMBH (DE)

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- international: *F04D29/04; F16C13/00; F16C19/18; F16C33/64; F16C35/12; F16C37/00; F04D29/04; F16C13/00; F16C19/02; F16C33/58; F16C35/00; F16C37/00; (IPC1-7): F16C37/00*

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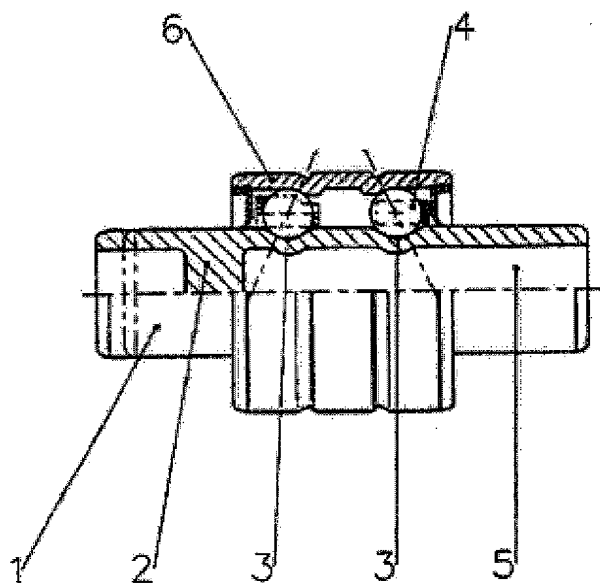
US5639167 (A1)

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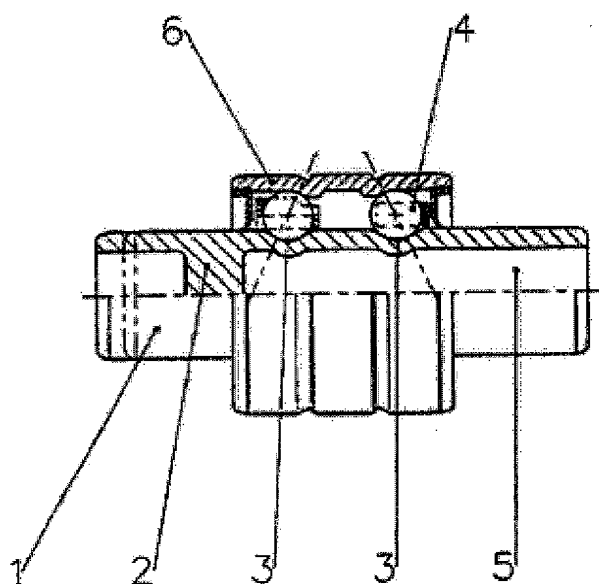
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(56) Documents Cited

GB 2085095 A

GB 1269440 A

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EP 0458499 A2

US 5054583 A

(58) Field of Search

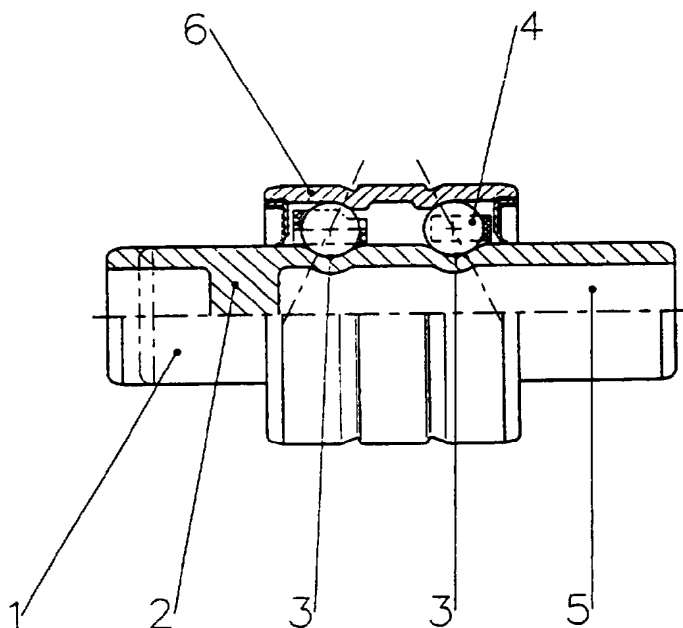
UK CL (Edition O) F2A AD26 AD28

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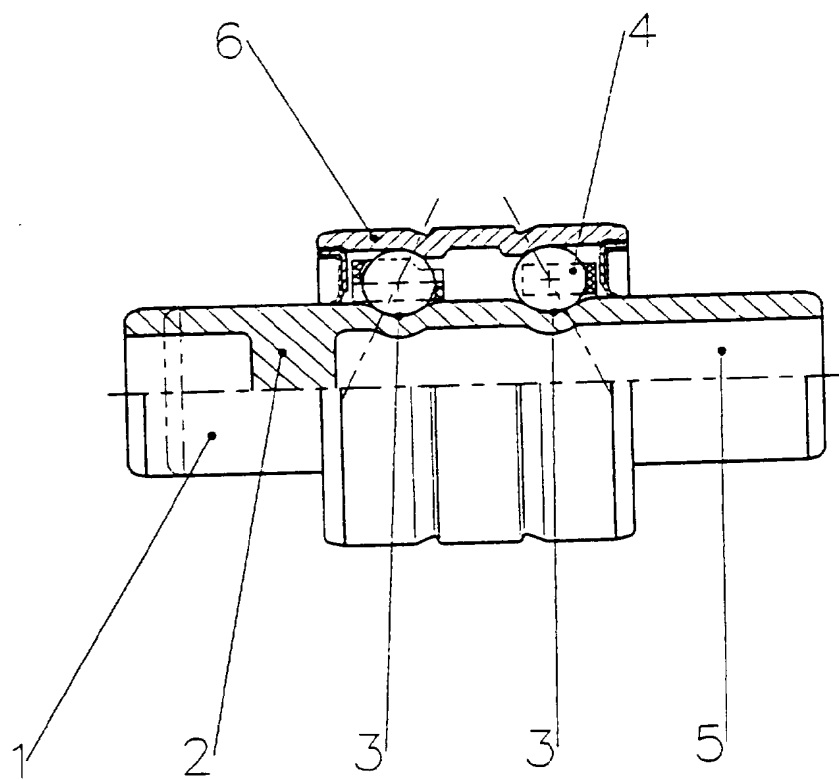
(54) Bearing arrangement

(57) In a bearing arrangement for the drive wheel and pump impeller of a motor vehicle cooling water pump, the shaft (1) rotates in a bearing outer ring (6) by means of rows of balls (4) and projects beyond the outer ring on both sides. The shaft is hollow, and comprises a wall (2) which divides the cavity (5) and is disposed on the drive side outside the rows of balls. Coolant can penetrate the entire bearing space to dissipate heat from the bearing zone. The shaft may be made by flow pressing or forging.



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BEARING ARRANGEMENT

This invention relates to a bearing arrangement, in particular to a bearing arrangement for the drive wheel and pump impeller of an IC engine cooling water pump e.g for a motor vehicle.

5 It is already known from DE 2 238 309 to provide a two-row ball bearing with solid shaft for a water pump. The ball raceways are worked directly into the shaft. The bearing is secured against the cooling circuit by means of a slide ring sealing arrangement. One of the slide rings is attached to the bearing outer ring. The bearing is heavy due to its solid construction and consequently its manufacture requires a large amount of material. Furthermore, due to the conductivity of the material, undesired
10 high temperatures may occur inside the bearing,.

It is an object of at least the preferred embodiments of the present invention to provide a bearing arrangement which enables material to be saved without loss of rigidity of the shaft and which renders the cooling of the bearing possible.

The present invention provides a bearing arrangement for the drive a bearing
15 arrangement for the drive wheel and pump impeller of an IC engine cooling water pump, having a shaft which is disposed to rotate by means of at least one rolling element race in a bearing outer ring and projects beyond said ring, wherein the shaft is hollow and has a wall which divides the cavity therein and is located on the drive side of said shaft axially spaced from said rolling element race.

20 In the construction the shaft preferably is converted into a tubular shape from a solid portion of round stock by deformation e.g by flow pressing (drawing or extrusion) or by forging. For example, two press rams may penetrate the blank from both axial ends to form blind-bore-shaped recesses. The wall remaining outside the rolling elements on the drive side (i.e the side facing the pulley or other drive wheel)
25 confers high radial rigidity on the shaft for the mounting of the drive pulley, while at the same time hermetically sealing the pump cooling water space. The cooling water can penetrate below the entire bearing space and dissipate heat from that zone.

Preferably, the raceway for the rolling elements are formed in the shaft without removing material therefrom.

30 A preferred embodiment of the present invention will now be described, by

way of example only, with reference to the accompanying drawing.

5 A shaft 1 is constructed substantially hollow from both sides and is provided with a wall 2 outside of rows of balls 4. The raceways for the balls 4 are worked in without cutting and are shaped torus-like in cavity 5. Raceways are also formed on common outer ring 6.

The outer members required for the intended use of the bearing for water pumps, such as drive wheel, pump impeller, casing and slide ring seal are unimportant for the features according to the invention and are therefore not shown.

10 Each feature disclosed in this specification (which term includes the claims) and/or shown in the drawings may be incorporated in the invention independently of other disclosed and/or illustrated features.

The text of the abstract filed herewith is repeated here in full as part of the specification.

15 A bearing arrangement for the drive wheel and pump impeller of a motor vehicle cooling water pump, having a shaft which is disposed to rotate in a bearing outer ring by means of two rows of balls and projects beyond the bearing outer ring on both sides, characterised in that the shaft (1) is produced by the extrusion process and has a wall (2) which separates the cavity (5) and is disposed on the drive side outside the rows of balls (4).

CLAIMS

1. A bearing arrangement for the drive wheel and pump impeller of an IC engine cooling water pump, having a shaft which is disposed to rotate by means of at least one rolling element race in a bearing outer ring and projects beyond said ring, wherein
5 the shaft is hollow and has a wall which divides the cavity therein and is located on the drive side of said shaft axially spaced from said rolling element race.
2. A bearing arrangement according to Claim 1 wherein the shaft is of flow-pressed construction.
3. A bearing arrangement according to Claim 1, wherein said race is formed in
10 the shaft without the removal of material therefrom.
4. A bearing arrangement substantially as herein described and as shown in the accompanying diagram.

Amendments to the claims have been filed as follows

1. A bearing arrangement for the drive wheel and pump impeller of an IC engine cooling water pump, having a shaft of flow-pressed construction which is disposed to rotate by means of at least one rolling element race in a bearing outer ring and projects beyond said ring, wherein the shaft is hollow and has a wall which divides the cavity therein and is located on the drive side of said shaft axially spaced from said rolling element race.
2. A bearing arrangement according to Claim 1, wherein said race is formed in the shaft without the removal of material therefrom.
3. A bearing arrangement substantially as herein described and as shown in the accompanying diagram.



Application No: GB 9604931.7
Claims searched: 1-4

Examiner: Brian B Caswell
Date of search: 23 May 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.O): F2A (AD26; AD28)
Int Cl (Ed.6): F16C
Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2085095 A (SKF) see especially Figure 1	1,3
A	GB 1269440 (TRW) see whole document	
X	GB 512100 (SKF) see whole document	1
X	EP 0458499 A2 (MAKINO) see especially Figure 1A	1
X	US 5054583 (WRZYSZCZYNSKI) see especially Figure 1	1

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.
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A Document indicating technological background and/or state of the art.
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.